Presentation for Maryland Health Care Commission Task Force

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This presentation discusses a NHIN Architecture Prototype project made possible by a contract from the Office of the National Coordinator for Health Information Technology (ONC), DHHS. The content is solely the responsibility of the authors and does not necessarily represent the official view of ONC.

What we set out to do

- Build a secure NHIN prototype that leveraged existing infrastructure and:
  - Allow patient control of their health information
  - Connect systems with a wide variety of IT platforms
  - Deal with the critical issues of data normalization
  - Provide enough flexibility to allow local choice in the degree of centralization of data
  - Provide a personal health record, provider access to critical clinical data, and allow public health researchers access to data to support business intelligence and decision support
- Show we could quickly build out regional HIEs

What we set out to do

- Allow patient choice regarding which providers can see their health care data
- Provide robust auditing capabilities
- Place filtering within the provider organizations to allow local choice regarding the degree of data sharing
- Design an architecture that is flexible regarding where data is stored
- Convert local messages to HL7 V3 standard messages
- Map local terminology to federal standard terminology (LOINC, SNOMED CT, etc.)

Our Distinct Health Care Markets

Characteristics of our distinct health care markets:

- There is no regional information infrastructures for sharing health data
- Hospital and provider systems are widely diverse
- Few systems based on federal health standards
- Very representative of the US health care market
- Required rapidly building RHIO capabilities, leveraging existing s

Accenture Healthcare & Technical Partners

West Virginia Medical Institute

- New River Health Association - Beckley
- Cabin Creek
- ARH-Beckley
- ARH Summers County
- AMFM-Beckley
- WV University Physicians of Charleston

The Commonwealth of Kentucky's Eastern Region Health Community

- ARH-Hazard Regional Medical Center and Family Health Services
- University of Kentucky Clinic
- University of Kentucky HealthCare Chandler Medical Center
- Kentucky River District – Letcher County Health Dept
- Kentucky River District – Perry County Health Dept

CareSpark

- Holston Medical Group
- Mountain States Health Alliance
- Johnston Memorial Hospital
- Sullivan County Regional Health Dept.

Core Technical Components

- Cisco Systems
- Initiate Systems
- Oracle
- Orion
- Quovadx
- Sun Microsystems

Technical Partners

- Apelon
- AMA
- BEA
- CCSi
- CGI – Federal
- Intellithought
- LucentGlow
- Oakland Consulting Group
- Reactivity
- Red Hat

Provider Organizations

- America
- Appalac
- Appalac
- Appalac
- Cabin C
- Holston
- Johnsto
- Kentuck
- Kentuck
- Mountai
- New Riv
- Sullivan
- Universi
- Universi
- West Vi

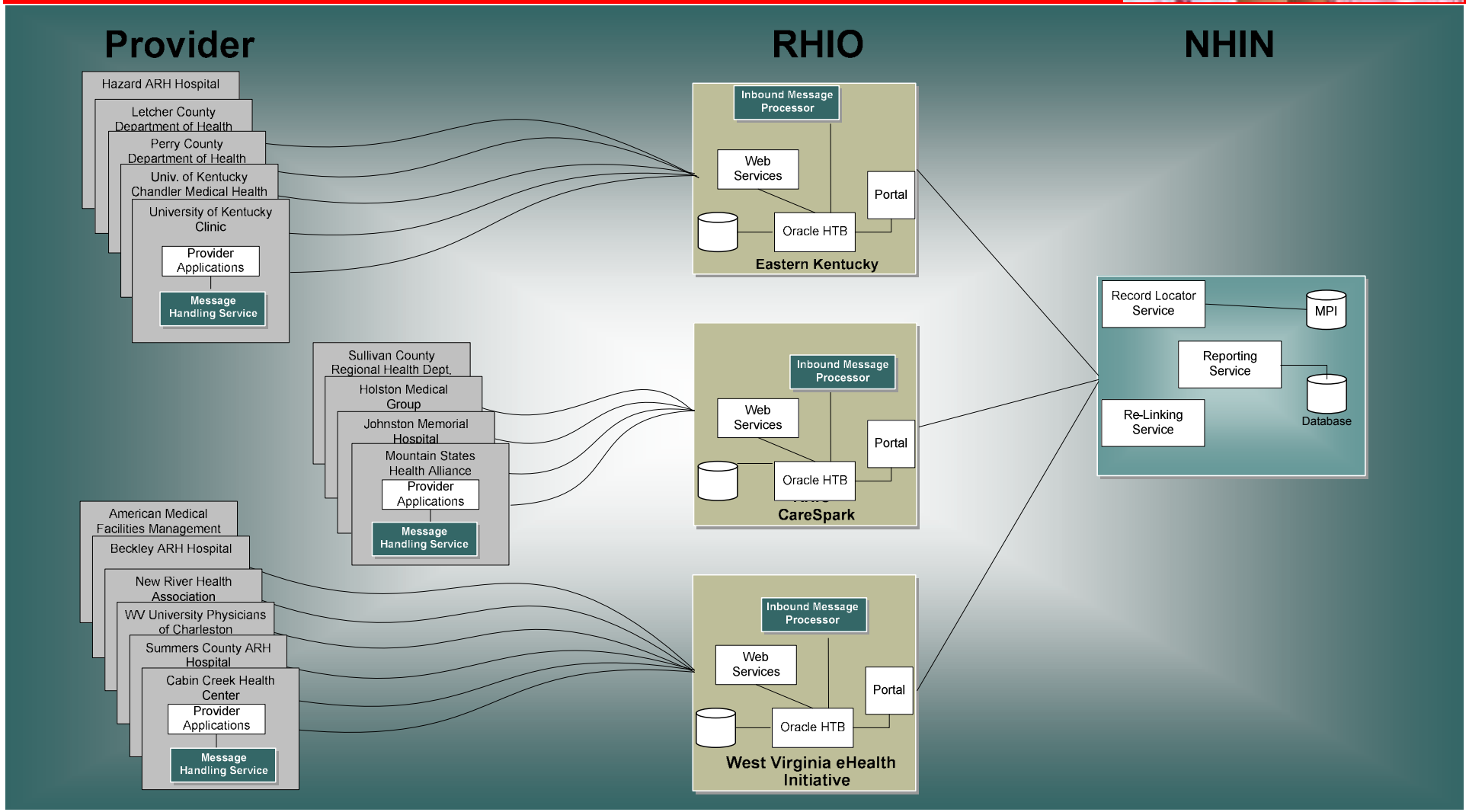
- Carilion
- CDEMS
- Cerner Lab
- Cerner Pathology
- CoPath
- Custom Data Pr
  (CDP)
- Dolbey Trans
- EHS Practice
  Management
- GE IDX
- General Transcription
- HEX
- IDX GPMS
- Invision
- IPMC Pathology

- KBT E
- McKe
- McKe
- SCC
- Sieme
- Softm
- Sunqu

- ADT
- ORU
- ographics

45 Interfaces

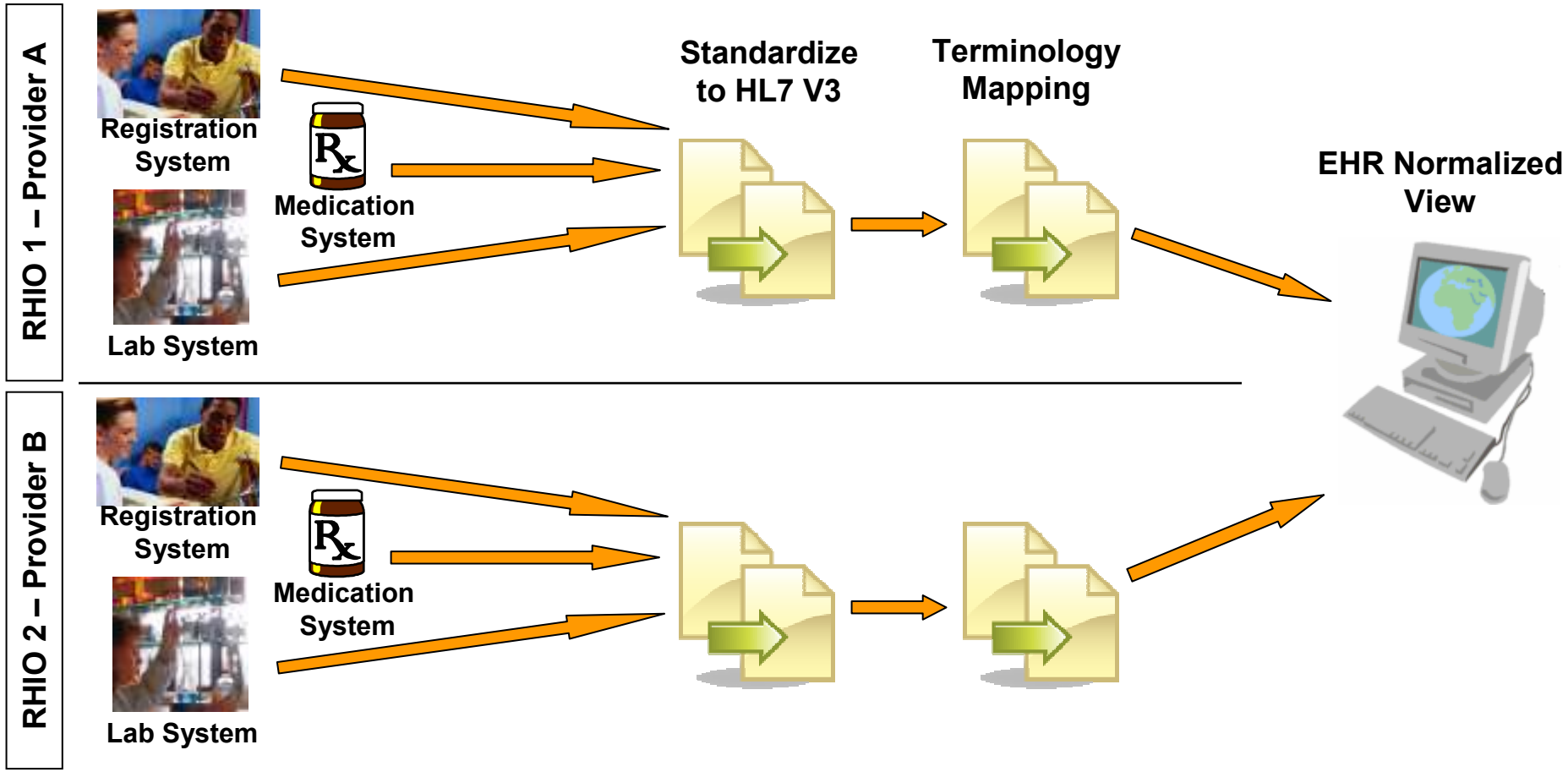
Accenture's Solution Overview



Key Considerations When Designing HIEs

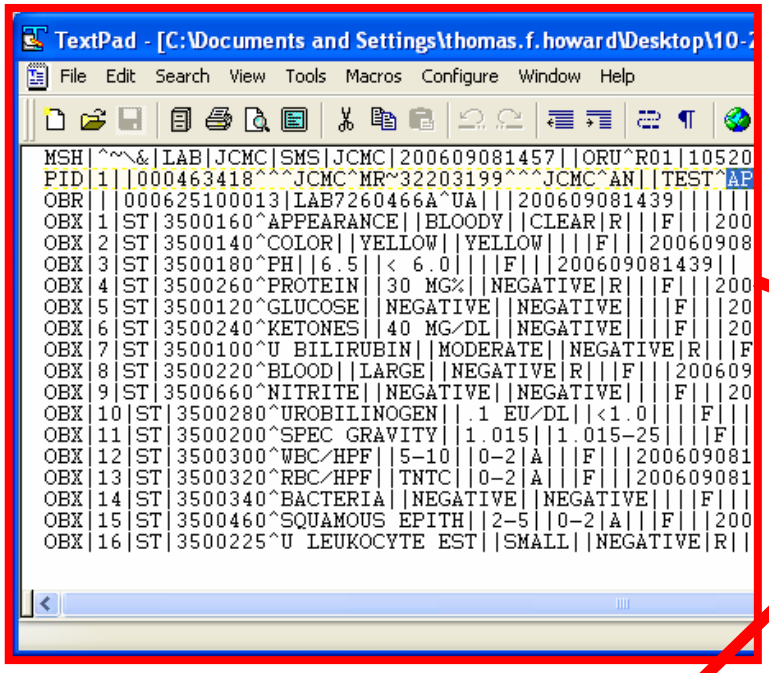
- Sits alongside and leverages investment in current provider EHR and lab systems
- Only sends permissioned data outside a provider organization's firewalls
- Heavy emphasis on data standardization
  - Critical for public health, care management, clinical research
- Sophisticated Information Governance
  - Crucial for obtaining patient trust
- Flexible, Hybrid Architecture
  - Allows for increased control of where data resides (Federated vs. Centralized)

Standardization & Terminology Mapping



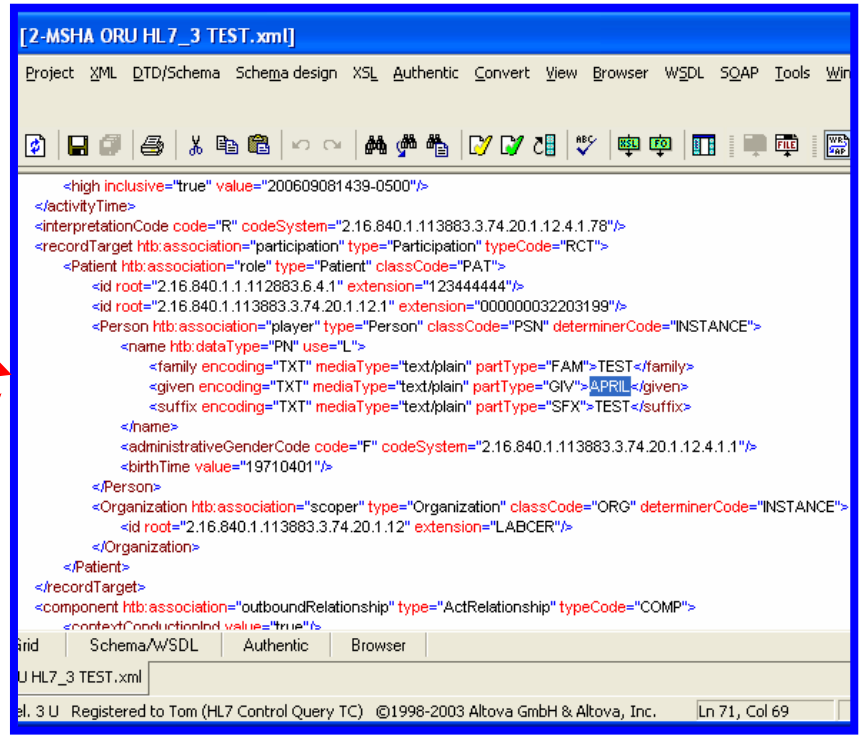
Data Standardization

Local Message (e.g HL7 V2.3.1)



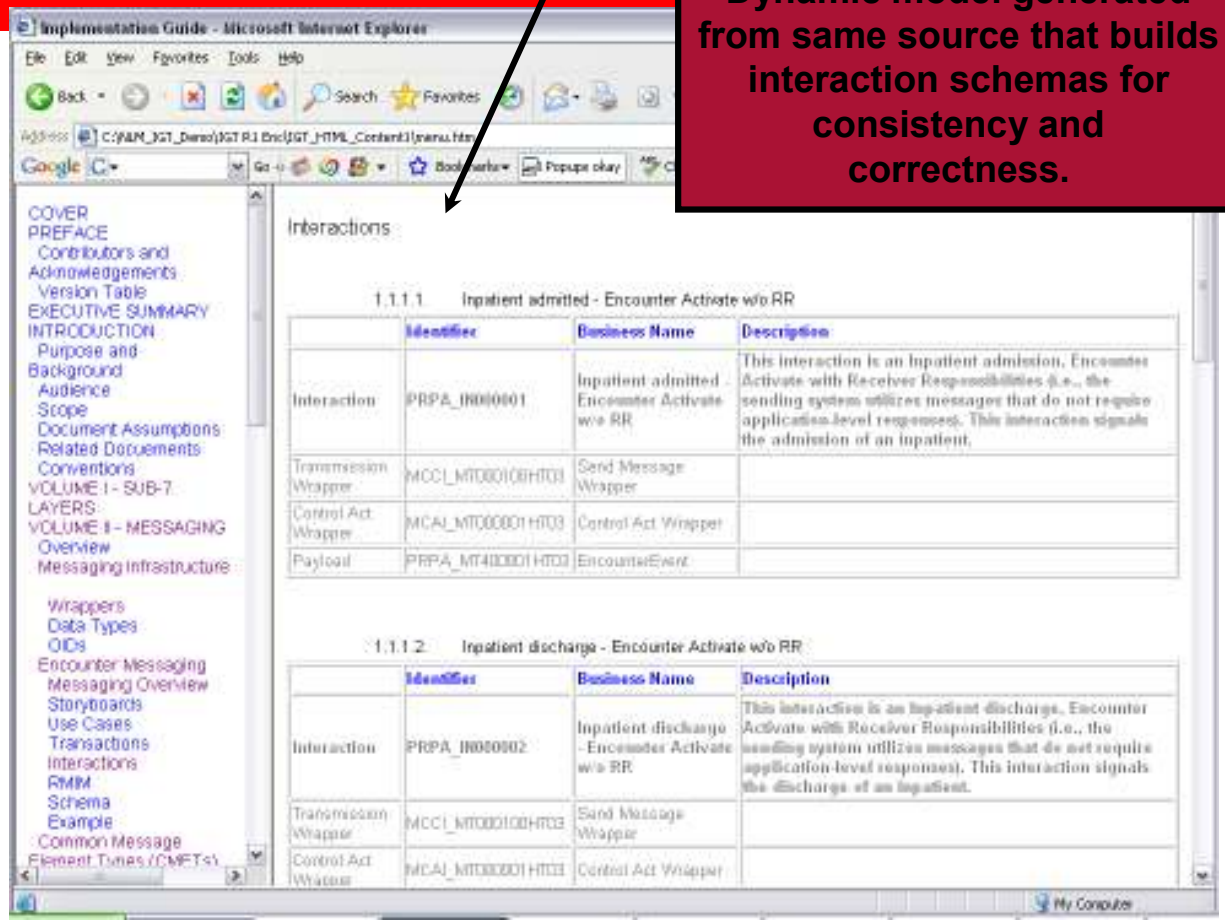
(or Local Flat File)

Standard Message (HL7 V3 - HTB)

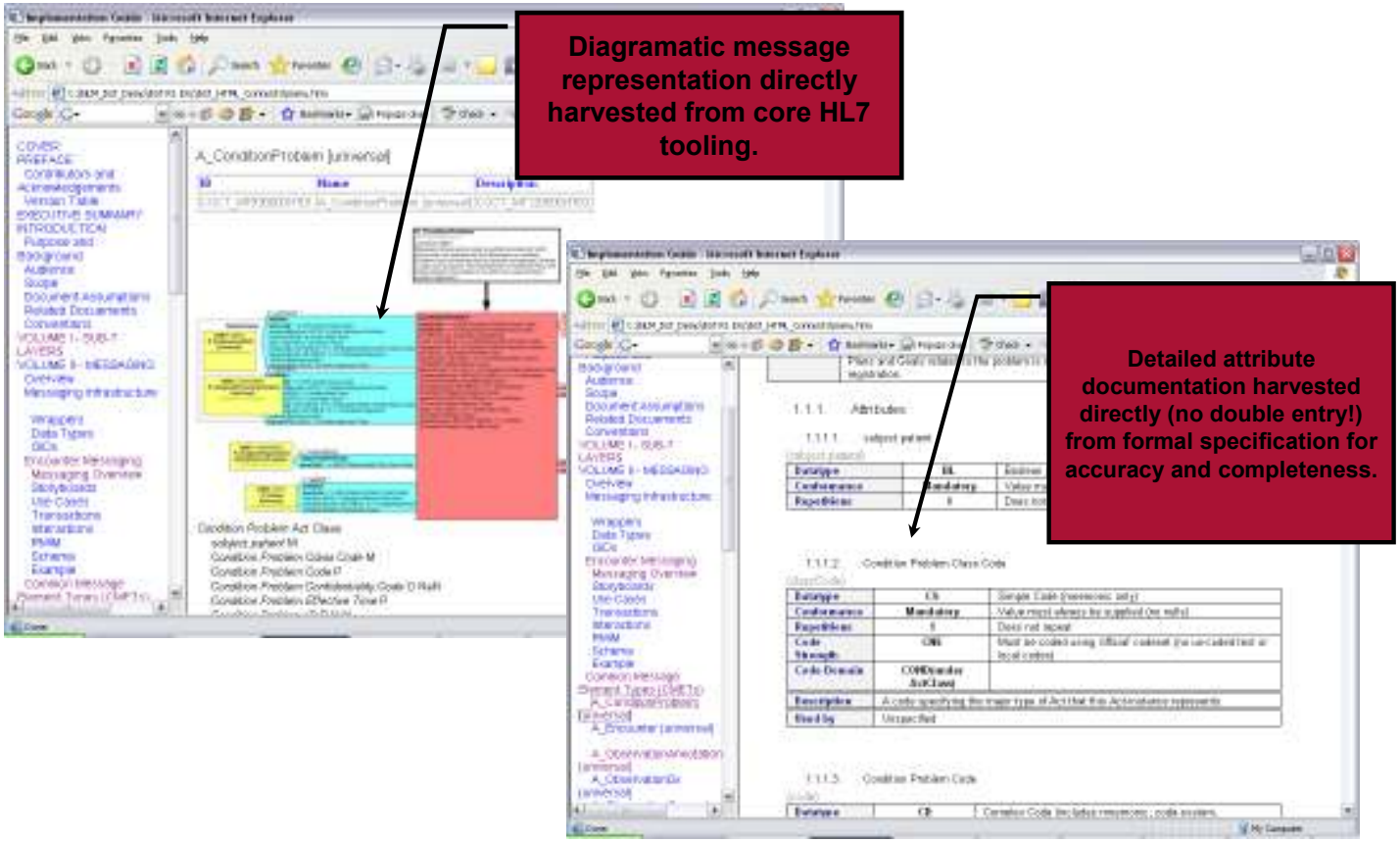


Developing an Implementation Guide for HL7 v3 Messages HL7/NLM/ASPE/GPI Project

Dynamic model generated from same source that builds interaction schemas for consistency and correctness.



Sample Outputs – Static Message Model Walkthroughs

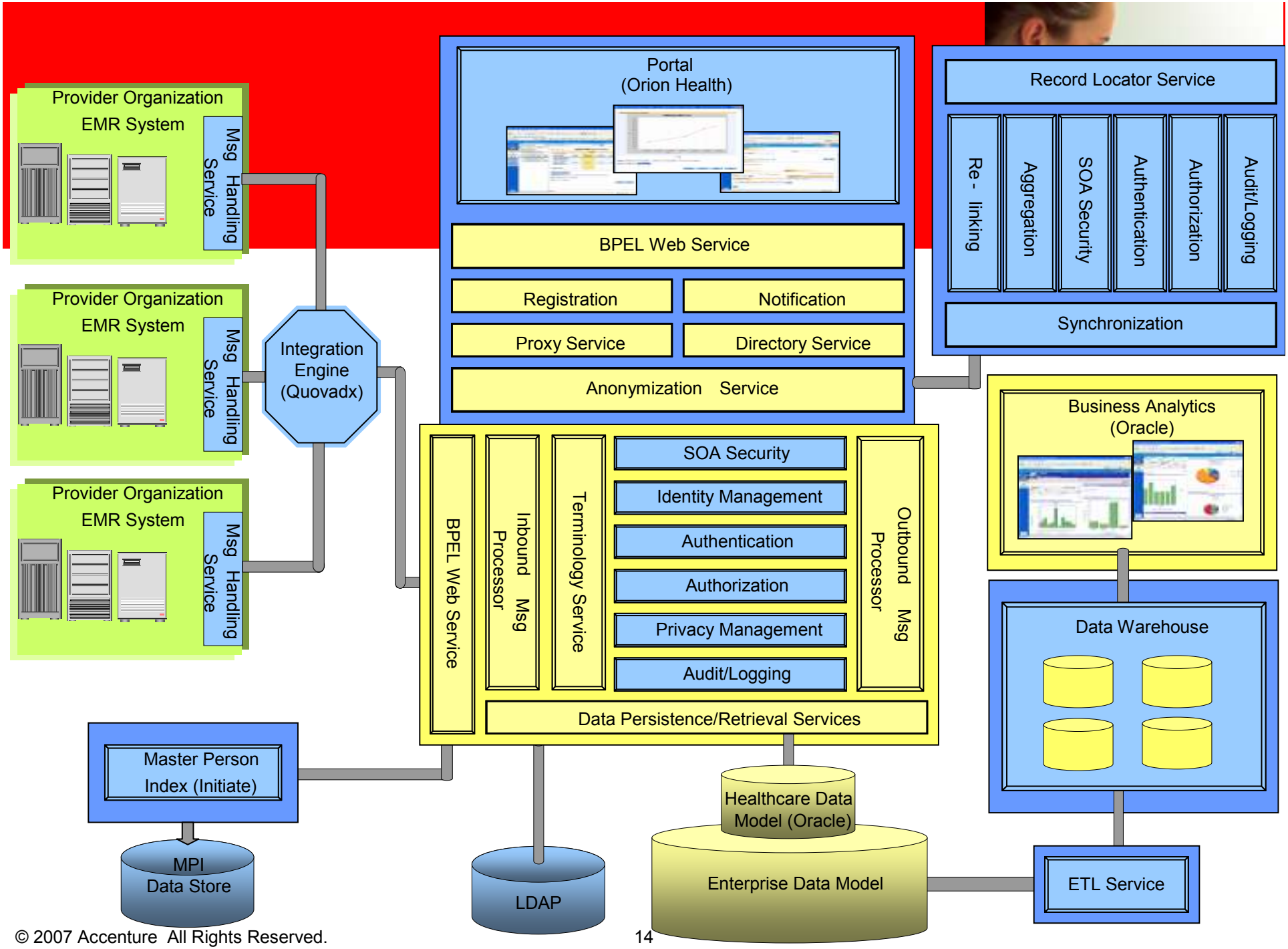


Terminology Normalization

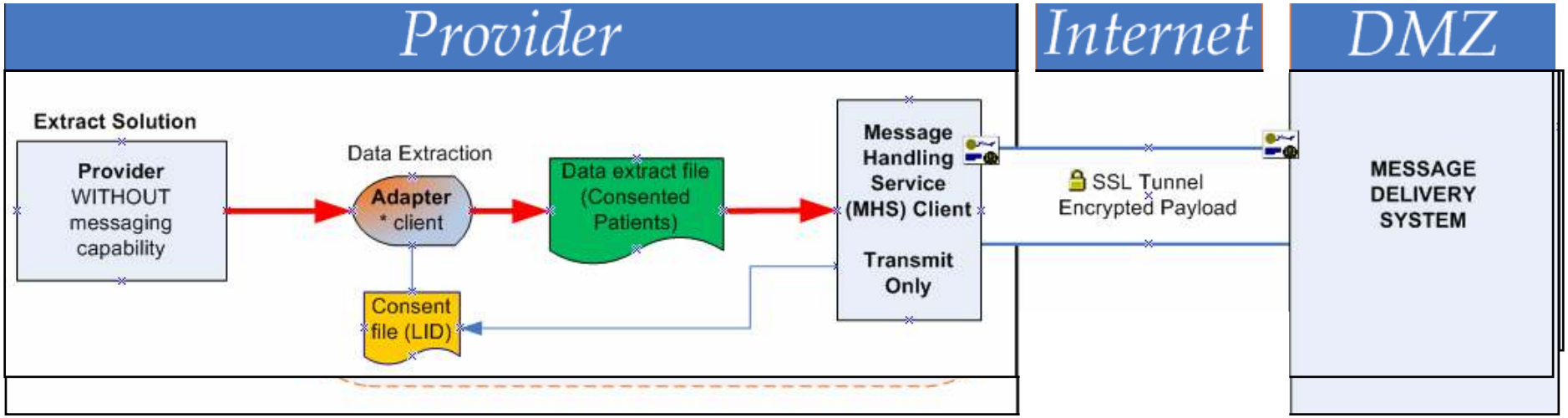
Lab Code Mapping

Local Code	Local Description
RF	RHEUMATOID FACTOR SCRN
RFT	RHEUMATOID FACTOR QUANTITATIVE
RA	RHEUMATOID FACTOR QUANTITATIVE
RHEU	RHEUMATOID FACTOR
CO2	CARBON DIOXIDE
LDLLL	LDL CHOLESTEROL CALC
LDLCALC	LDL CHOL CALC
LEU	Blood Leukocytes

LOINC Code	LOINC Description
33910-1	RHEUMATOID FACTOR:ACNC:PT:SER:ORD:
6928-6	RHEUMATOID FACTOR:ACNC:PT:SER:QN:EIA
2028-9	2028-9:CARBON DIOXIDE:SCNC:PT:SER/PLAS:QN::
13457-7	CHOLESTEROL.IN LDL:MCNC:PT:SER/PLAS:QN:CALCULATED
11156-7	LEUKOCYTES:MORPH:PT:BLD:NOM:

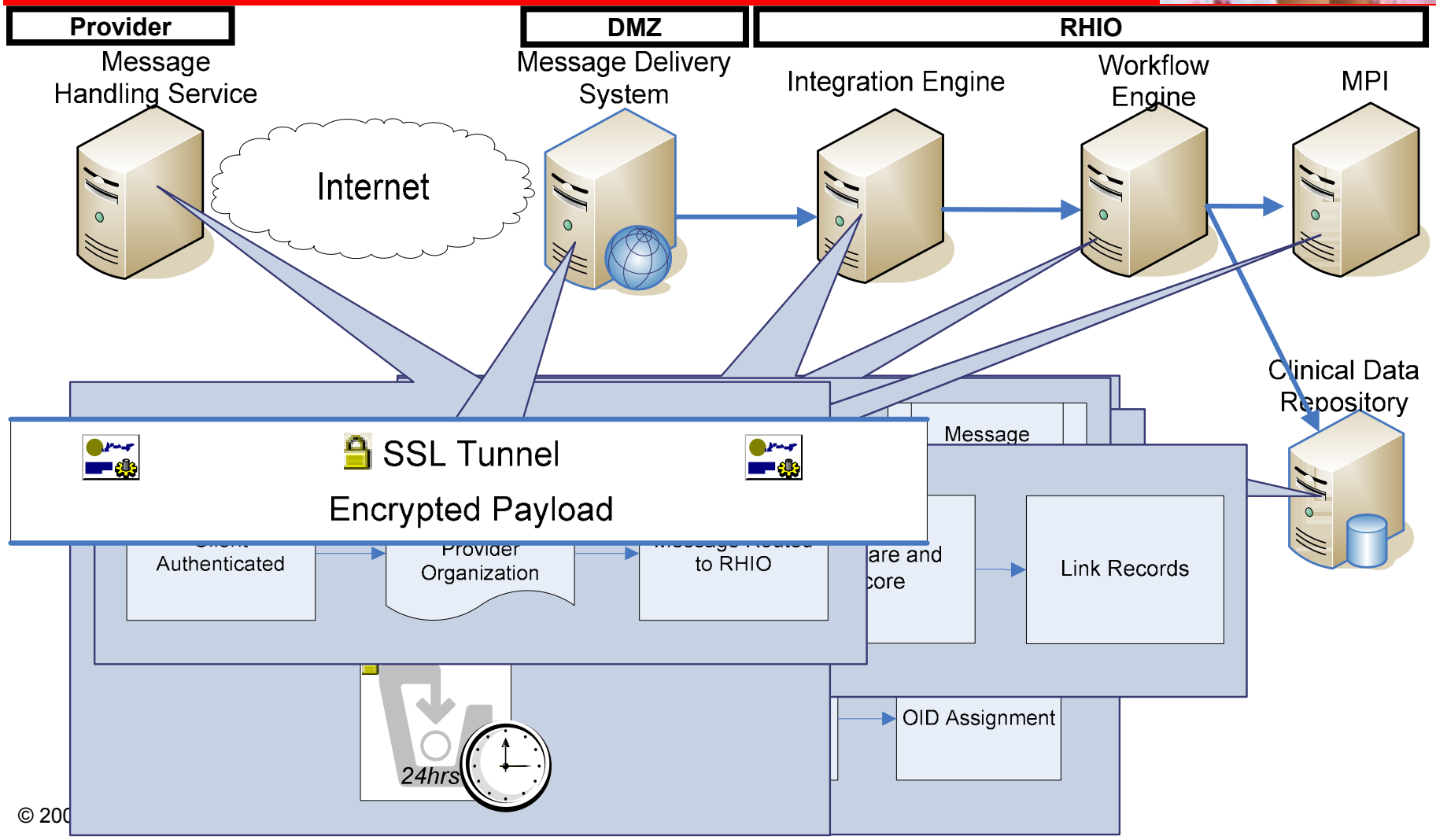


Messaging Architecture – Provider Communication



Extract Solution

Messaging Architecture



Enterprise Master Person Index (EMPI)

1. Standardize and Derive → 2. Select Candidates → 3. Compare and Score → 4. Link Records (or Not)

Na
Ph
Ad

Na
Phone:
Street: 123 S. 10th ST

Accuracy – Probabilistic algorithm scores attributes and record to weight importance of each potential match

Standard

Emily Walker Oliver

data creates more reliable matching results

E Walker Oliver

83%

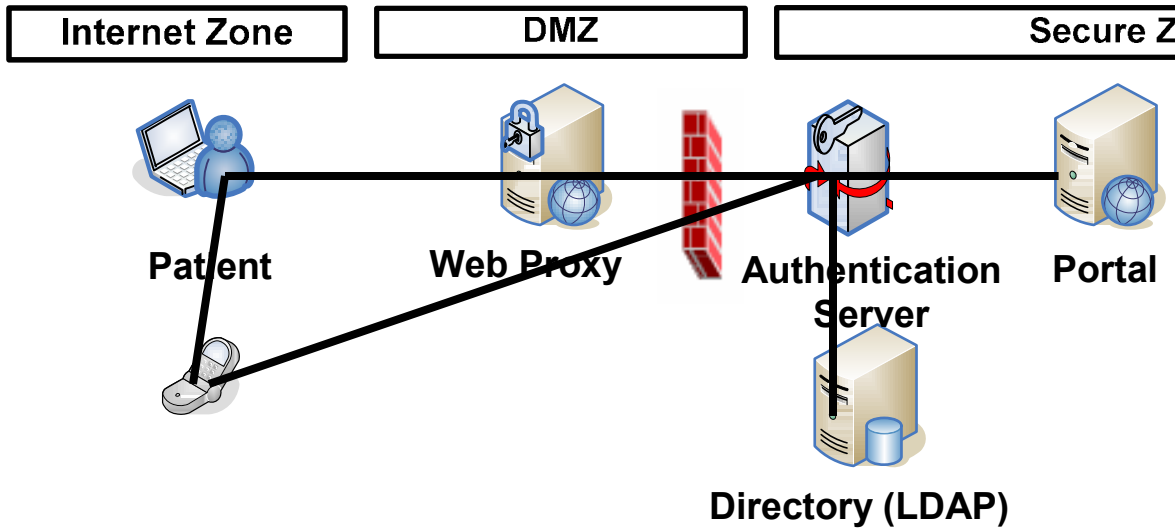
99.9%

72%

67%

Customized thresholds allow each region to minimize manual remediation

Security Architecture - Authentication



One Factor

Two Factor

A flexible authentication architecture is key!

Security Architecture - Authorization

Role Based Access Control

What Data Types or System Functions can be used by the User

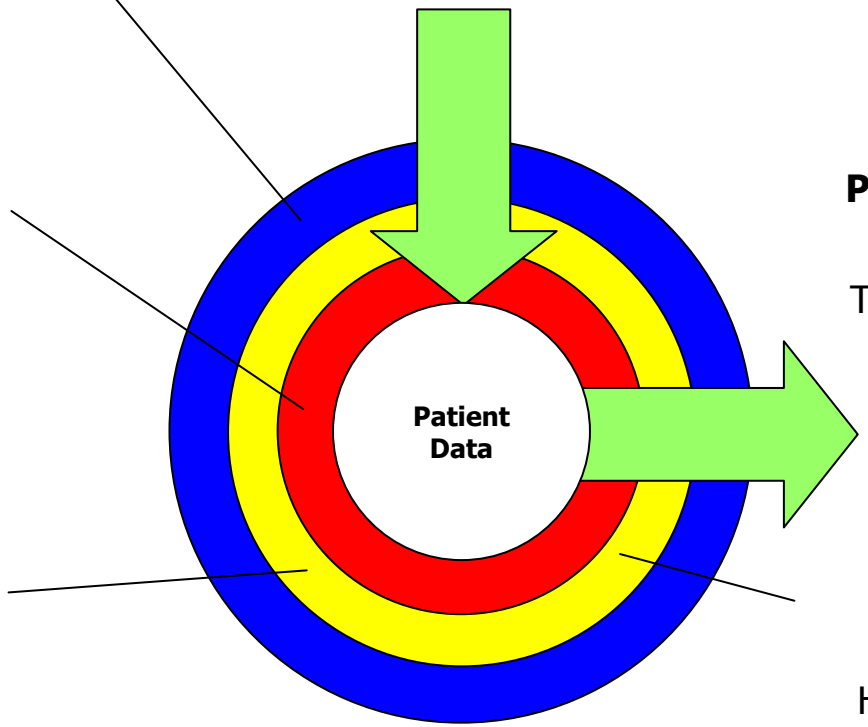
Patient Consent

Has the Patient consented to information being shared outside of authoring organization?

Patient Provider Relationships

Does a relationship exist between the Patient and the User?

Authenticated User seeks to access Patient Data



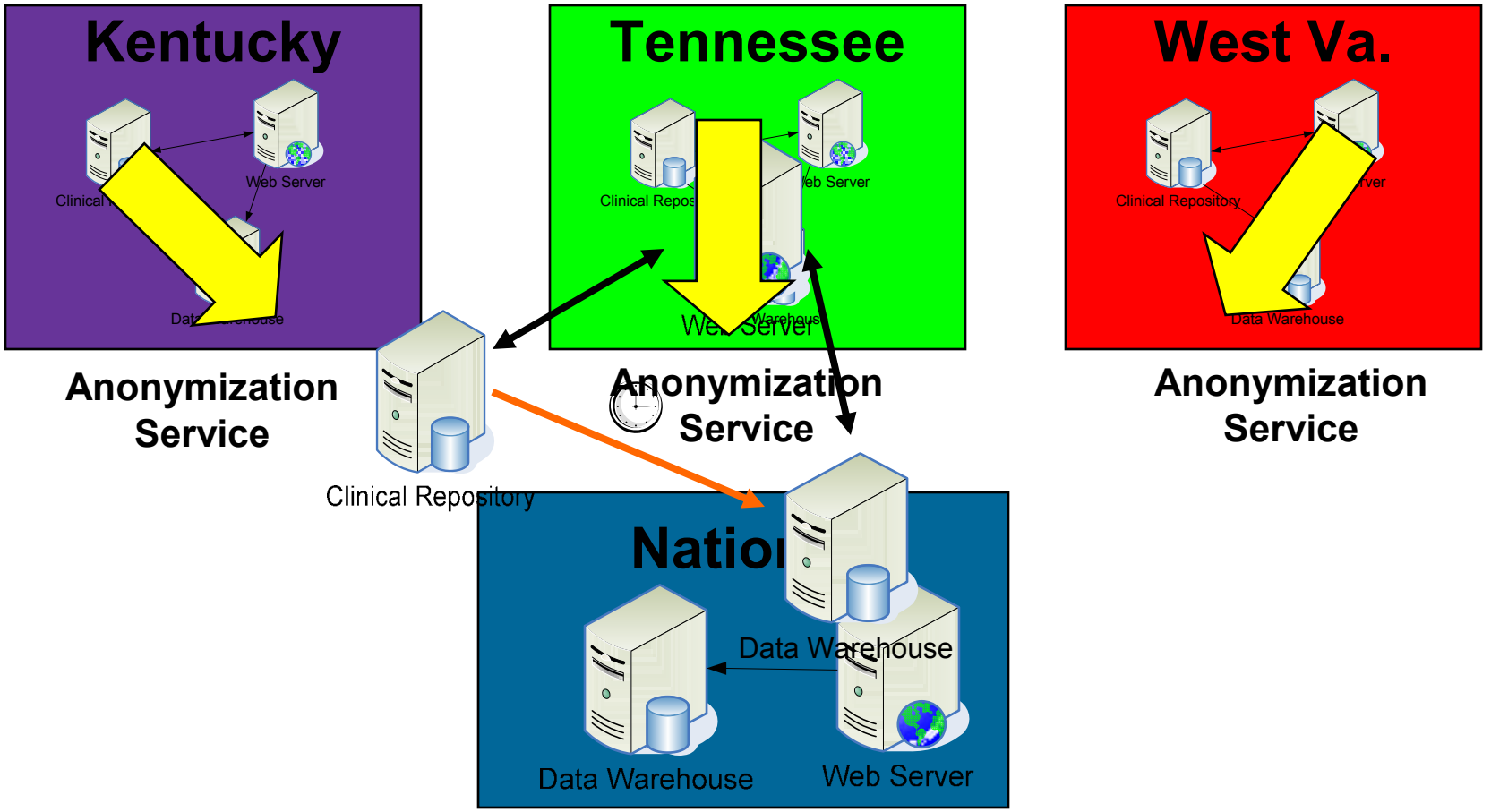
Pseudonymisation and Anonymisation

To enable use of data for secondary purposes

Block List

Has the Patient restricted the User's access to their record?

Reporting Architecture



Prototype Successes & Challenges

- Building a NHIN requires teamwork between a complex and large number of stakeholders
- Incentives must be aligned and be of sufficient magnitude to promote health data sharing for the NHIN to succeed
- Data can be extracted from a wide variety of provider systems and converted into semantically normalized data
- Flexibility regarding architecture will be critical given the variety of views regarding privacy

- OUR CONSORTIUM SUCCEEDED IN DEVELOPING A NATIONWIDE HEALTH INFORMATION NETWORK PROTOTYPE